SEMSIM

Southeastern Michigan Snow and Ice Management

Presented by

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SEMSIM

(Southeastern Michigan Snow and Ice Management) System

City of Detroit
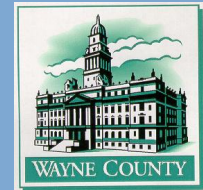

Oakland Co.

Macomb Co.

Wayne Co.

SEMSIM is:

- **A partnership between the 4 largest local road agencies in Mich.**
  - Road Commission for Oakland County
  - Wayne County Department of Public Services, Roads Division
  - City of Detroit Department of Public Works
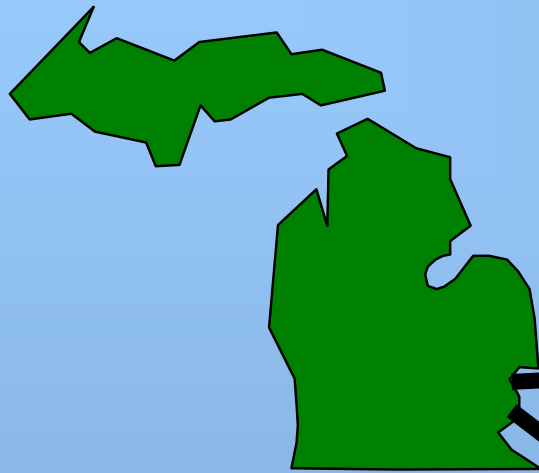 - Road Commission of Macomb County

Other Partners

- SMART Bus system (radio communications backbone).

- MDOT & the Federal Highway (Federal funding)

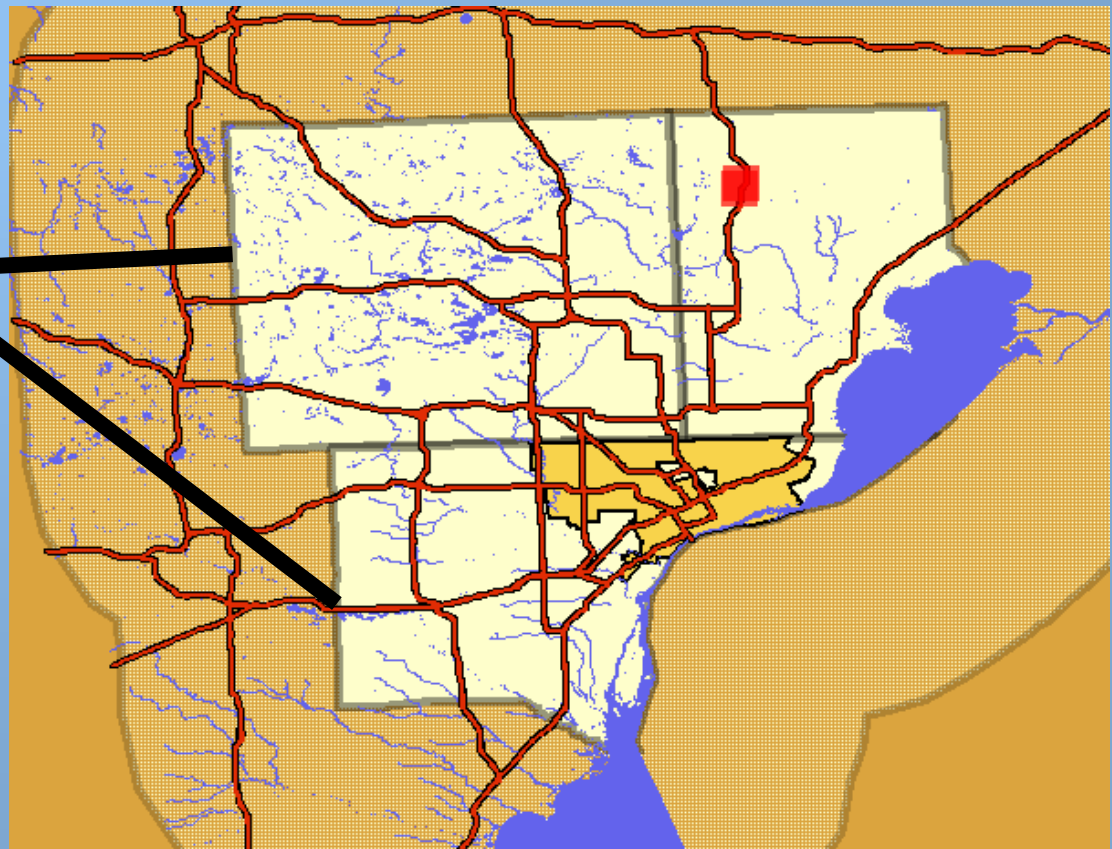- General Dynamics (engineering support and system maintenance)

Area of Operation

Southeastern Michigan:

- home to nearly 4 million people

- 15,000 miles of public roads

SEMSIM Goals:

- Increase motorist safety & mobility

- Reduce road agency barriers

- Reduce cost & environmental impact

- Share road condition data with travelers & transit agencies

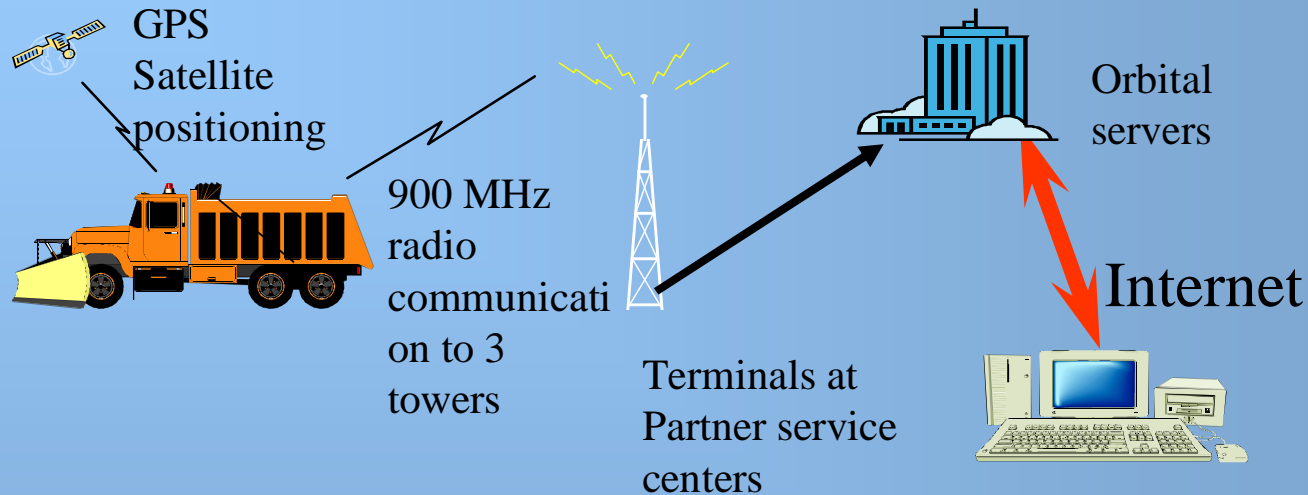- Create a model for other road agencies to emulate

SEMSIM System

- Over 500 winter maintenance vehicles

- 36 regional maintenance centers

How is SEMSIM funded?

- $4 million in federal earmarked funding

- $6 million in CMAQ funding through SEMCOG

- SEMSIM Partners contributed a 20% match

How does SEMSIM Work?

GPS Satellite positioning

900 MHz radio communication to 3 towers

Terminals at Partner service centers

Orbital servers

Internet

- Uses Global Positioning System (GPS)
- Trucks transmit data using SMART radio system
- Orbital servers use Internet to provide map position and data to SEMSIM Partners

SEMSIM
Southeastern Michigan Snow and Ice Management

SEMSIM Web-Based Application

- SEMSIM largest such tracking system in US

- First Web-based winter maintenance system

- SEMSIM can be accessed anywhere in the world

- Hosted by Orbital Sciences at secure 24x7 facility

The satellite-based global positioning system (GPS):

- Allows agencies to track all trucks on a computer map.

- It shows supervisors which roads have been plowed/salted.

- Software can locate the nearest 3 trucks to a selected location.

Vehicle List

Vehicle number:
Click on to get vehicle dialog box

Vehicle Information Provided:

• Location

• Belly plow up or down

• Front plow up or down

• Air and pavement temperature

• Spreader status and spreader rate

Vehicle List with Map & Messages

Message to be sent to vehicle

Binoculars:
Click on to find vehicle on map.
Map is presented and map box is
checked

Map Display

The toolbar at the top of the map provides a number of ways to control and provide information from the map

Expands map to full SEMSIM area

Display vehicle information for vehicle trace clicked on

Centers map to spot where clicked

Add landmark

Show 3 closest vehicles to point clicked

Clear other tools

Zoom in & out

Expands map to show whole view

Turns traces on or off

Displays address of spot clicked

Shows position of address entered

Commands   ☑ Map
Street Address:

City:
, or
Zip Code:

Find Address

Time	From --> To		Message	
2/13/04 8:24 AM	957624 --> FE	Clear Alarm	Emergency State	
2/13/04 9:43 AM	957624 --> FE	Emergency Alarm		
2/13/04 8:24 AM	957624 --> FE	Emergency Alarm		

ORBTRAC   SEMSIM

Commands ☑ Map ☐ Stat ☐ Msg Views: City of Detroit over ▾ Vehicle Groups: Detroit ▾ S Factor: 2x

02/13/2004 10:53:16

Done   Internet

Factor: 2x ▾

Southeastern Michigan Snow and Ice Management
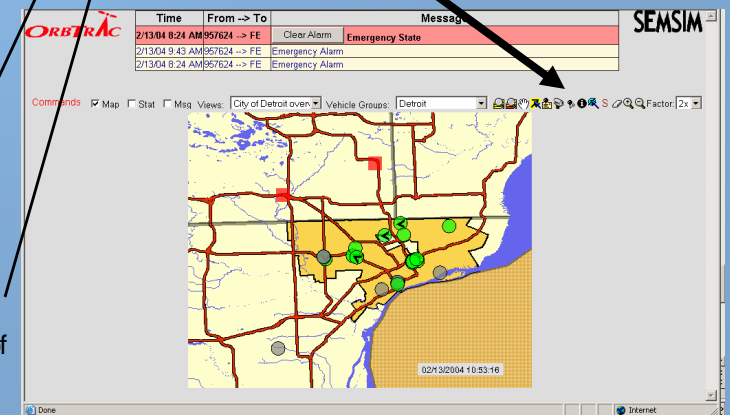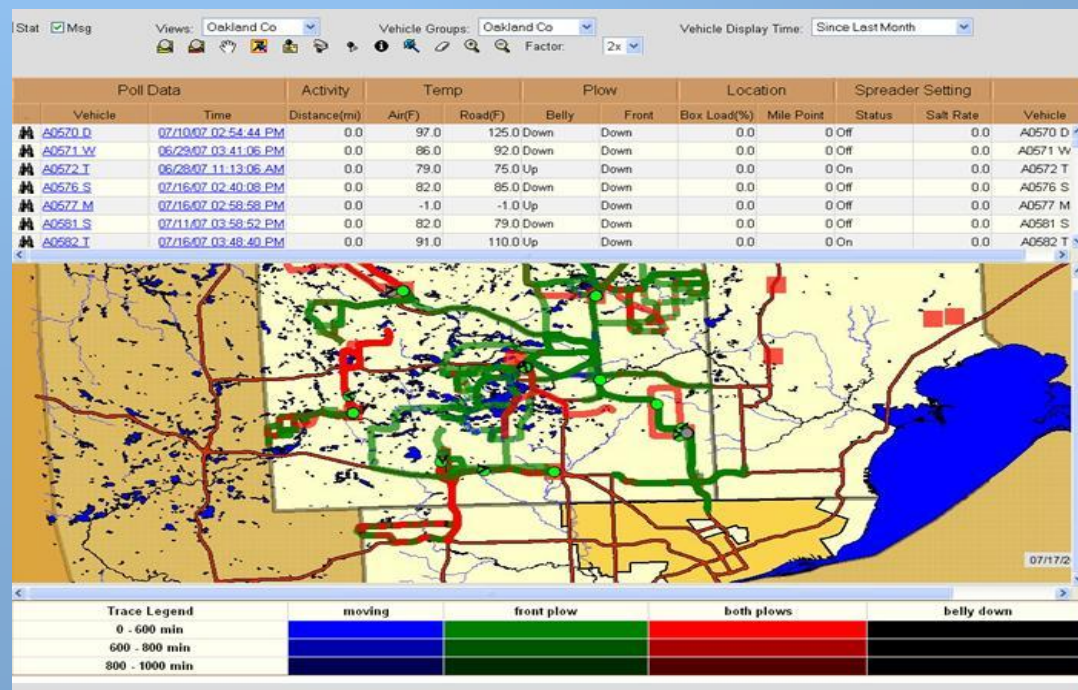
Map "traces" of a truck.

Trace colors behind vehicle indicate
what the vehicle is doing (plowing,
salting or just moving).

Messaging

- A freeform or canned message can be entered in the dialog box

- Select the vehicle you want the message to go to

- The users box shows who is on the system. You can also send a message to them

- Press "send" to send the message

Playback Previous Storm Incidents

- Analyze operations

- Identify ways to improve efficiencies

- Check the exact time when specific roads were plowed or salted

In-Vehicle Communications

Display allows management & drivers to quickly communicate non-verbally much like email

- Send type written messages to drivers

- Drivers respond with one-touch, preset messages

Air & Road Temperature Sensor

Located on the driver's side mirror

- Records air temperature
- Uses infrared sensor to measure pavement temperature

Front Plow Sensor

- Monitors whether plow is up or down
- There is also a sensor on the underbody scraper ("float" blade)

Computerized Salt Spreaders

- Spreader controller provides salt usage to SEMSIM system

Interagency Cooperation

- SEMSIM Partners can help in emergencies. (Bridge icing, accidents)

- SEMSIM Partners can communicate with each other through messaging system.

Preparing Employees

To minimize employee opposition to SEMSIM, the Partners:

- Provided group and individual training

- Answered questions about how SEMSIM was to be used

- Emphasized SEMSIM as an efficiency & safety tool, not a disciplinary tool.

What's next for SEMSIM?

- Improved reports

- Truck engine data

- Integration of information with traffic operations

- Adjustable spread rate based on the temperature sensor

- Dynamic routing

Lessons Learned

Training   Training   Training

1. Make it as "hands-on" as possible

2. Be realistic with expectations

3. Be patient -- Stay positive

4. Listen to suggestions from Operators

5. Start out with a limited number of vehicles

Lessons Learned

There will always be unforeseen complications with new technology.

1. Compatibility of equipment.

2. Implementation will take longer than you expect.

3. High-tech projects are a constant battle (obsolete software and hardware)

4. Select champions.

Lessons Learned

- Have a full-time, on-site project manager
- Visit other agencies doing similar projects:
    - The SEMSIM Partners visited:
        -Minn. DOT
        -IOWA DOT

Potential Year-round Improved Efficiencies:

Designed for winter road maintenance, SEMSIM can improve:

- Pothole patching operations
- Gravel road grading/brine application
- Work planning
- Monitoring contractors
- Etc.

Thank You

Questions?

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